U.S. DEPARTMENT OF ENERGY | Legacy Management

Gnome-Coach, New Mexico, Site

FACT SHEET

This fact sheet provides information about the Gnome-Coach, New Mexico, Site.
This site is managed by the U.S. Department of Energy Office of Legacy Management.

Site Description and History

The Gnome-Coach Site is located in southern Eddy County, New Mexico, 11 miles east of the Pecos River and 25 miles southeast of the city of Carlsbad. The site is approximately 680 acres. The land is currently withdrawn from all forms of disposition under the public land laws, including U.S. mining laws and leasing under mineral leasing laws.

On December 10, 1961, a 3-kiloton-yield nuclear device was detonated at a depth of 1,183 feet below ground surface in a thick, bedded salt deposit within the Salado Formation.

This was the first nuclear test conducted in the Plowshare Program, a research and development program created by the U.S. Atomic Energy Commission (AEC), a predecessor agency to the U.S. Department of Energy (DOE). The purpose of the program was to determine the technical and economic feasibility of peaceful application of nuclear energy. The Plowshare testing program began with Gnome, the first of 27 nuclear tests. The program concluded in May 1973. During that 12-year period, 23 tests were conducted at the Nevada Test Site near Las Vegas, Nevada, and three natural-gas-reservoir stimulation tests were conducted in New Mexico and Colorado.

The Gnome test was a multipurpose experiment designed to provide data concerning heat generated from a nuclear explosion, isotope production, neutron physics, seismic measurements in a salt medium, and design data for developing nuclear devices specifically for peaceful uses. In preparation for the Gnome test, a 10-foot-diameter vertical emplacement shaft was drilled to a depth of 1,216 feet below ground surface. A horizontal tunnel was drilled 1,116 feet northeast from the shaft, ending in a hook shape designed to be self-sealing.

The Gnome detonation created a cavity approximately 160 feet in diameter and melted about 3,150 tons of rock. The melted rock mixed with approximately 11,415 tons of salt that was propelled into the cavity by steam pressure produced from water in the rock. Most of the nongaseous radioactive residue was trapped in the mixture of rubble and once-molten salt at the bottom of the chamber. Although it had been planned as a contained explosion, a portion of the gases produced

Location of Gnome-Coach, New Mexico, Site

by the Gnome device vented radioactive materials into the atmosphere through the vertical shaft located approximately 1,116 feet southwest of the cavity.

A second test, Coach, was to be located within the Salado Formation near the Gnome test and was scheduled for 1963. The Coach test was canceled, but the site is referred to as the Gnome-Coach site.

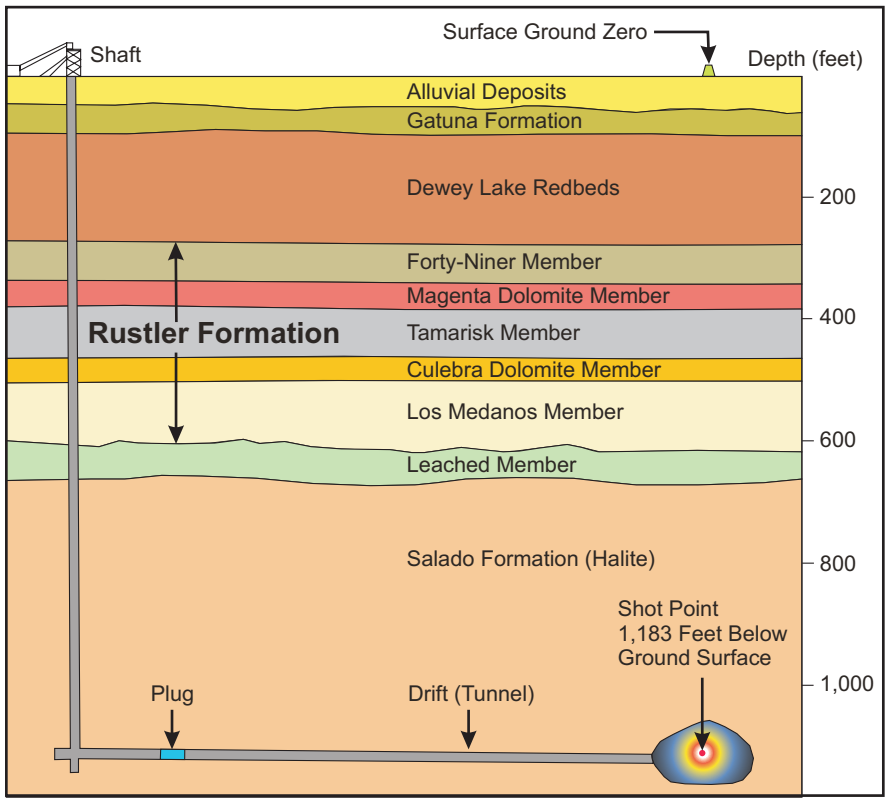
Post-test activities included drilling into the test cavity from locations directly over the cavity as well as reentry through the shaft and horizontal tunnel following removal of rubble and solidified melt. Five months after the blast, personnel physically entered through the tunnel and into the test cavity to directly observe the cavity interior and obtain photographic documentation of the cavity size and shape.

Surface Conditions

Post-test drilling and removal of contaminated subsurface material resulted in surface contamination at the Gnome-Coach Site. The original cleanup associated with the site was conducted between 1968 and 1969. During this phase, radioactive sludge from

holding tanks and liquid from evaporation ponds was pumped into the test cavity, contaminated equipment and solid waste were disposed of in the emplacement shaft, all salvageable equipment was decontaminated, all uncontaminated buildings and equipment were moved off site, and all AEC test wells and drill holes were plugged and abandoned.

In 1972, an area reconnaissance revealed that the cover material on the salt disposal pile that remained from drilling operations was eroding, exposing material contaminated from the reentry operations, and surface contamination associated with the salt disposal pile was spreading. The second major cleanup from 1977 to 1979 included excavating contaminated soils and burying them in the shaft, removing concrete pads, general housekeeping activities, and extensive post-cleanup sampling. During these operations, the test cavity and horizontal tunnel were filled to capacity, and remaining contaminated material was removed and transported to the Nevada Test Site.



Cross Section of the Gnome-Coach, New Mexico, Site

In 2002, the DOE Office of Environmental Management completed a corrective action investigation of the Gnome-Coach Site surface area. These studies included sampling and surveying of surface and shallow subsurface soils to a depth of 20 feet below ground surface. Several areas with elevated levels of radiological contamination were identified, but the concentration levels in each instance did not exceed risk-based cleanup levels. The Corrective Action Investigation Report recommends no further action for clean closure of the site surface under the New Mexico Voluntary Remediation Program.

A permanent monument consisting of a brass plaque mounted in a concrete base was placed at surface ground zero at the site. Wording on the plaque describes the historical significance of the project and restrictions on subsurface excavation.

Subsurface Conditions

Because no feasible cleanup technology exists, no remediation has been conducted in the subsurface and none is planned. DOE will conduct subsurface modeling and investigation to assess the potential for off-site migration of radionuclides from the test cavity.

On the basis of the historical use of the site and characterizations conducted at similar sites, subsurface contaminants of concern at the Gnome-Coach Site include radioactive fission products such as cesium, plutonium, and tritium.

Land Use

The designated surface use of the Gnome-Coach Site is for grazing. Principal land use in the area is livestock grazing, oil and gas exploration and production, and recreation. Although active oil and gas leases exist for the land surrounding the Gnome-Coach Site, oil and gas leases are not permitted on the site.

Institutional Controls

No institutional controls are required for the surface of the Gnome-Coach Site. Current subsurface restrictions are stated on the monument placed at the site. The inscription indicates no excavation or drilling is permitted to penetrate Section 34, T23S, R30E, New Mexico Principal Meridian, at any depth between the surface and 1,500 feet below land surface. The former shaft, horizontal tunnel, and surface ground zero are all located within Section 34.

Long-Term Hydrologic Monitoring Program

Since 1972, the U.S. Environmental Protection Agency has annually monitored ground water quality at and near the Gnome-Coach Site as part of a long-term hydrologic monitoring program. Samples are collected from 10 wells and 2 municipal water supplies in the vicinity of the site.

Regulatory Setting

The federal government holds title to, and DOE is responsible for, the radioactive and other hazardous materials generated by DOE and predecessor agencies at the Gnome-Coach Site. The State of New Mexico Oil and Gas Commission and DOE agreed to remediate the surface of the Gnome-Coach Site under the State Voluntary Remediation Program.

Legacy Management Activities

On October 1, 2006, responsibility for the Gnome-Coach Site transferred from the DOE Office of Environmental Management to the DOE Office of Legacy Management. The Office of Legacy Management is responsible for (1) developing and implementing a Long-Term Surveillance and Maintenance Plan, including determination of the subsurface monitoring plan; (2) accepting the transfer of records and real property; (3) managing site records; (4) implementing and managing existing agreements/programs with regulatory agencies; and (5) responding to stakeholder inquiries.

Contacts

Documents related to the Gnome-Coach Site are available on the DOE Office of Legacy Management website

http://www.LM.doe.gov/land/sites/nm/gnome/gnome.htm.

For more information about DOE Office of Legacy Management activities at the Gnome-Coach Site, contact

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